

The claims defining the invention are as follows:

1. A method of preparing a substantially clear aqueous solution containing magnesium bicarbonate, including the steps of:

- contacting, with species resulting from the dissolution of carbon dioxide in water, an aqueous suspension of magnesium carbonate, at suitable conditions of pressure and temperature, so as to obtain an aqueous solution of magnesium bicarbonate; and

- controlling the pH of the said solution so that, after reaction of the said species with the magnesium carbonate, the final pH falls within a range of from about 8,0 to about 8,8,

wherein the concentration of calcium compounds or ions in the water and any other ingredients used to prepare the aqueous solution is about equal to or lower than that whereby insoluble calcium species would result, thereby allowing a substantially clear aqueous solution to be prepared.

2. A method of preparing a substantially clear aqueous solution containing magnesium bicarbonate, including the step of contacting, with species resulting from the dissolution of carbon dioxide in water, an aqueous suspension of magnesium carbonate, at suitable conditions of pressure and temperature, so as to obtain an aqueous solution of magnesium bicarbonate and magnesium carbonate, said aqueous solution having a pH, after reaction of the said species with the magnesium carbonate, within a range of from about 8,0 to about 8,8, wherein the concentration of calcium compounds or ions in the water and any other ingredients used to prepare the aqueous solution is about equal to or lower than that whereby insoluble calcium species would result, thereby allowing a substantially clear aqueous solution to be prepared.

3. The method of claim 2 further comprising controlling the pH of the suspension.

4. A method of preparing a substantially clear aqueous solution containing magnesium bicarbonate, including the steps of:

- contacting, with species resulting from the dissolution of carbon dioxide in water, an aqueous suspension of magnesium carbonate, at suitable conditions of pressure and temperature, so as to obtain an aqueous solution of magnesium bicarbonate at a pH, after reaction of the said species with the magnesium carbonate, falling within a range of from about 8,0 to about 8,8; and

- agitating the suspension so as to keep in suspension a major portion of the magnesium carbonate until substantially all of the said magnesium carbonate has been converted to dissolved magnesium bicarbonate,

wherein the concentration of calcium compounds or ions in the water and any other ingredients used to prepare the aqueous solution is about equal to or lower than that whereby insoluble calcium species would result, thereby allowing a substantially clear aqueous solution to be prepared.

5. The method of claim 4 further comprising controlling the pH of the suspension.

10 6. The method of claim 4 further comprising controlling the temperature of the suspension between about 0°C and about 25°C.

7. The method of claim 4 further comprising bottling the said aqueous solution of magnesium bicarbonate.

8. The method of claim 4 further comprising bottling the said aqueous solution of magnesium bicarbonate at a pH within a range of from about 7.8 to about 9.

9. The method of claim 4 further comprising bottling the said aqueous solution of magnesium bicarbonate when the magnesium bicarbonate solution is clear, or when the turbidity of the magnesium bicarbonate solution is no more than a slight haze and the pH falls within the range of about pH 7.8 to about pH 9.0.

20 10. An apparatus suitable for preparing an aqueous solution of magnesium bicarbonate, comprising:

- means for contacting, with species resulting from the dissolution of carbon dioxide in water, a suspension of powdered magnesium carbonate in water so as to form an aqueous solution of magnesium bicarbonate; and

25 - means for controlling the pH of the solution between about 7 and about 9 by adjusting the amount of at least one of the said species and the said powdered magnesium carbonate that is contacted with the other.

11. An apparatus suitable for preparing an aqueous solution of magnesium bicarbonate, comprising:

30 - means for contacting, with species resulting from the dissolution of carbon dioxide in water, a suspension of powdered magnesium carbonate in water so as to form an aqueous solution of magnesium bicarbonate; and

- means for keeping in suspension a major portion of said powdered magnesium carbonate until substantially all of the suspended magnesium carbonate has been converted to dissolved magnesium bicarbonate.

12. The apparatus according to claim 11 further comprising means for controlling
5 the pH of the solution between about 7.8 and about 9.

13. The apparatus according to claim 11 further comprising means for bottling the solution of magnesium bicarbonate.

14. The apparatus according to claim 11 wherein the means for contacting further comprises means for dissolving carbon dioxide in the water or in the said suspension so as
10 to form a solution containing the said species.

15. The apparatus according to claim 14 wherein the means for dissolving carbon dioxide comprises a sparger comprising a fine mesh such as a stocking like mesh.

16. The apparatus according to claim 15 wherein the means for dissolving carbon dioxide further comprises a tube and a helical baffle locatable within the tube, means for
15 disposing the tube in a substantially vertical position, means for introducing carbon dioxide into a first end of the tube which, in use, is located below a second end of the tube, and means for introducing water or the said aqueous suspension of magnesium carbonate at either of the first end or the second end thereof, whereby carbon dioxide is allowed to bubble through the tube and to be intimately contacted with the water or said
20 aqueous suspension of magnesium carbonate.

17. The apparatus of claim 11 further comprising means for bottling the magnesium bicarbonate solution.

18. A method of preparing a substantially clear aqueous solution containing magnesium bicarbonate, including the steps of:

25 - contacting, with species resulting from the dissolution of carbon dioxide in water, an aqueous suspension of magnesium carbonate, at suitable conditions of pressure and temperature, so as to obtain an aqueous solution of magnesium bicarbonate at a pH, after reaction of the said species with the magnesium carbonate, falling within a range of from about 8,0 to about 8,8;

30 - controlling the pH of the said solution within the said range until substantially all of the said magnesium carbonate has been converted to dissolved magnesium bicarbonate; and

- bottling the said magnesium bicarbonate solution,

wherein the concentration of calcium compounds or ions in the water and any other ingredients used to prepare the aqueous solution is about equal to or lower than that whereby insoluble calcium species would result, thereby allowing a substantially clear aqueous solution to be prepared.

5 19. A method of preparing a substantially clear aqueous solution containing magnesium bicarbonate, including the steps of:

- contacting, with species resulting from the dissolution of carbon dioxide in water, an aqueous suspension of magnesium carbonate, at suitable conditions of pressure and temperature, so as to obtain an aqueous solution of magnesium bicarbonate at a pH, after reaction of the said species with the magnesium carbonate, falling within a range of from about 8,0 to about 8,8;

- agitating the suspension so as to keep in suspension a major portion of the magnesium carbonate until substantially all of the said magnesium carbonate has been converted to dissolved magnesium bicarbonate; and

15 - bottling the said aqueous magnesium bicarbonate solution,

wherein the concentration of calcium compounds or ions in the water and any other ingredients used to prepare the aqueous solution is about equal to or lower than that whereby insoluble calcium species would result, thereby allowing a substantially clear aqueous solution to be prepared.

20 20. An apparatus suitable for preparing an aqueous solution of magnesium bicarbonate, comprising:

- means for contacting, with species resulting from the dissolution of carbon dioxide in water, a suspension of powdered magnesium carbonate in water so as to form an aqueous solution of magnesium bicarbonate;

25 - means for controlling the pH of the solution between about 7 and about 9 by adjusting the amount of at least one of the said species and the said powdered magnesium carbonate that is contacted with the other; and

- means for bottling the said solution of magnesium bicarbonate.

30 21. An apparatus suitable for preparing an aqueous solution of magnesium bicarbonate, comprising:

- means for contacting, with species resulting from the dissolution of carbon dioxide in water, a suspension of powdered magnesium carbonate in water so as to form an aqueous solution of magnesium bicarbonate;

- means for keeping in suspension a major portion of said powdered magnesium carbonate until substantially all of the suspended magnesium carbonate has been converted to dissolved magnesium bicarbonate; and

- means for bottling said solution of magnesium bicarbonate.

5 22. A method for the manufacture of an aqueous solution comprising dissolved magnesium bicarbonate and dissolved magnesium carbonate, wherein the process includes the step of contacting an aqueous suspension of a source of magnesium cations with such an amount of a species resulting from the dissolution of carbon dioxide in water and having an initial pH below about 7 as is sufficient to result in the said aqueous
10 solution comprising dissolved magnesium bicarbonate and dissolved magnesium carbonate having a pH of from about 8 to about 8,9 and to be substantially clear, wherein the concentration of calcium compounds or ions in the water and any other ingredients used to prepare the aqueous solution is about equal to or lower than that whereby insoluble calcium species would result, thereby allowing a substantially clear aqueous
15 solution to be prepared.

23. A method for the manufacture of an aqueous solution comprising dissolved magnesium bicarbonate or dissolved magnesium bicarbonate and dissolved magnesium carbonate, wherein the process includes the step of: (i) contacting an aqueous suspension of a source of magnesium cations with bubbles of carbon dioxide gas, (ii) agitating the
20 contacted aqueous suspension, (iii) recontacting the agitated contacted aqueous suspension with bubbles of carbon dioxide gas, and (iv) repeating steps (i) to (iii) as required, to provide a pH in the aqueous solution of from about 8 to about 9, wherein the concentration of calcium compounds or ions in the water and any other ingredients used to prepare the aqueous solution is about equal to or lower than that whereby insoluble
25 calcium species would result, thereby allowing a substantially clear aqueous solution to be prepared.

24. The method according to claim 1 further including sterilising the water and the suspension.

25. The method according to any one of claims 1 to 9, 18, 19, or 22 to 24,
30 wherein the concentration of calcium compounds or ions in the water is reduced by creating conditions favouring the precipitation of calcium carbonate and by the removal of such precipitated calcium carbonate from the solution.

26. An apparatus for the manufacture of an aqueous solution comprising dissolved magnesium bicarbonate and dissolved magnesium carbonate, the apparatus comprising means for contacting an aqueous suspension of a source of magnesium cations with such an amount of a species resulting from the dissolution of carbon dioxide in water and having an initial pH below about 7 as is sufficient to result in the said aqueous solution comprising dissolved magnesium bicarbonate and dissolved magnesium carbonate having a pH of from about 7.5 to about 8.9 and to be substantially clear.

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